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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,307	09/27/2006	Hiroyuki Yamazaki	NE353-PCT(US)	3548

21254 7590 04/14/2009
MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

ZHANG, YUANDA

ART UNIT	PAPER NUMBER
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2828

MAIL DATE	DELIVERY MODE
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04/14/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/594,307	Applicant(s) YAMAZAKI, HIROYUKI	
	Examiner YUANDA ZHANG	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/16/08 have been fully considered but they are not persuasive.
2. In response to Applicant's argument of claim 1, the Applicant has argued that Jones fails to disclose or suggest the limitations of "an LD-side waveguide having a first end connected to one of the plurality of ring resonators through an optical-coupling device" because Jones discloses evanescent wave coupling method. The Examiner respectfully disagrees. The Examiner agrees with the Applicant that Jones does not disclose such optical coupling device. However, the Examiner clearly states in the obviousness rejection that Po cures the deficiency by teaching a multiple ring resonator in which a plurality of ring resonators, which are constituted with ring-type waveguides having optical path lengths different from each other, are coupled through **an optical coupling device** in order to obtain a waveguide with high selectivity (see Office action dated 9/16/08, paragraph 6). The Applicant's argument is merely directed to Jones itself not the combination. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Furthermore, the Applicant has argued that Jones fails to disclose or suggest a reflection film because Jones discloses a Bragg grating. The Examiner respectfully disagrees. According to the claimed limitations of claim 1, it recites "a reflection film provided to a second end of the reflection-side waveguide". A

Art Unit: 2828

reflection film is an element which reflects light. A Bragg grating is equivalent to a reflection film in which it selectively reflects light. The Applicant seems to interpret the claim narrowly. It is noted that the features upon which applicant relies (i.e., made of dielectric multilayer film, requires no tuning, avoids carrier injection, etc.) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

3. In response to Applicant's arguments of newly added claims 18-26, the arguments are moot in view of new grounds of rejection.

Claim Objections

4. Claim 25 is objected to because of the following informalities: the limitations of "over the entire regions of C-band and L-band" contradicts with "1.56 micron – 1.59 micron" because C-band covers wavelengths range from 1530 nm - 1565 nm or 1.53 micron - 1.565 micron and L-band covers wavelengths range from 1565 nm – 1625 or 1.565 micron – 1.625 micron. Therefore, the limitations of "over the entire regions of C-band and L-band should correspond to 1.53 micron - 1.625 micron. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-9 and 13-21 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (US Patent 6,959,028 B2) in view of Po (US Patent 4,852,117).

7. In re claim 1, with reference to figure 5, Jones discloses a tunable laser, comprising: a single ring resonator (40) (col. 3 lines 56-63); a LD-side waveguide (44) having a first end connected to one end of the ring resonator through evanescent coupling (col. 3 lines 56-63); a reflection-side waveguide (46) having a first end connected to the other end of the ring resonator through evanescent coupling (col. 3 lines 56-63); a single board (silicon substrate 50) on which the ring resonator, the LD-side waveguide and the reflection-side waveguide are formed (col. 4 lines 35-39); a reflection film (an end of Bragg grating 42 having high reflectivity is equivalent to a reflection film as indicated in figure 4 as a reflective filter) provided to a second end of the reflection-side waveguide; a laser diode chip (22) having a low reflection film (AR coating) formed on one of the two opposing emission end faces, which is optically coupled to the LD-side waveguide through the low reflection film (col. 3 lines 28-34); and a tuning device for changing a resonance wavelength of the multiple ring resonator (tuning is achieved by utilizing the thermo-optic effect in which refractive index can be changed by heating the substrate) (col. 4 lines 38-43).

8. Jones does not disclose a multiple ring resonator in which a plurality of ring resonators, which are constituted with ring-type waveguides having optical path lengths different from each other, are coupled through an optical-coupling device.

Art Unit: 2828

9. With reference to figure 10, Po discloses a multiple ring resonator in which a plurality of ring resonators (pump loop 18" and additional loop 136), which are constituted with ring-type waveguides having optical path lengths different from each other ("the additional cavity is of slightly different length"), are coupled through an optical-coupling device (lateral coupling 141 & 142) (col. 13 lines 50-64).

10. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the tunable laser of Jones with a multiple ring resonator as taught by Po in order to obtain a waveguide with high selectivity (col. 3 lines 32-33).

11. In re claim 2, Po discloses wherein the multiple ring resonator contains at least two or more of the ring resonators (see figure 10).

12. In re claim 3, Jones discloses wherein the low reflection film of the laser diode chip is abutted against the LD-waveguide to be optically coupled (laser diode 22 is optically coupled to waveguide 44) (see figure 5).

13. In re claim 4, Po discloses wherein the low reflection film of the laser diode is optically coupled to the LD-side waveguide through an optical device (lateral coupler 130, col. 13 line 9 & also see figure 10).

14. In re claim 5, Po discloses wherein the optical device comprises a lens (col. 13 line 4 and also see figure 9).

15. In re claim 6, Po discloses wherein, in the plurality of ring resonators, diameters of the ring waveguides are set so that intervals of reflection peaks appearing periodically become different, and there generates resonance at a meeting point of the

Art Unit: 2828

reflection peaks (inherent property of two ring resonators with different diameters coupled together).

16. In re claim 7, Po discloses wherein the optical-coupling devices comprise directional couplers (lateral couplers 130).

17. In re claim 8, Jones discloses wherein the tuning device changes refractive indexes of the ring-type waveguides of the ring resonators for changing the resonance wavelength ("localized heating may be employed to adjust the index of refraction of one of the resonator 40 and the grating 42", col. 4 lines 38-43).

18. In re claim 9, same rejection as applied to claim 8 is maintained.

19. In re claim 13, Jones discloses wherein a stray light suppressing part (Bragg grating 42) for suppressing influence of a stray light that is emitted from an end face extended from one end of the reflection-side waveguide is provided (selecting desired wavelength for feedback purpose) (col. 3 lines 56-63).

20. In re claim 14, same rejection as applied to claim 13 is maintained (Bragg grating 42 is considered to be a filter).

21. In re claim 15, same rejection as applied to claim 13 is maintained (Bragg grating 42 is considered to be a light-receiving element).

22. In re claims 16, Jones / Po have disclosed the claimed invention except the laser diode chip is mounted on the board (the limitation of "by a passive alignment technique" is not considered because it's a product-by-process limitation) which thereby renders alignment of the optical axis unnecessary. It would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the laser diode

Art Unit: 2828

on the same board since it was known in the art that mounting the laser diode on the same board with the waveguide makes the device more compact by reducing excessive space for extra board and avoid alignment issue.

23. In re claim 17, Jones discloses wherein the light-receiving element is mounted on the board (silicon substrate 50) (see figure 5) (the limitation of "by a passive alignment technique" is not considered because it's a product-by-process limitation).

24. In re claim 18, Jones / Po have disclosed the claimed invention above except wherein the reflection film comprises one of a dielectric multilayer film and a metal film. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a Bragg grating that is made of dielectric multilayer or metal, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

25. In re claim 19, Jones discloses wherein reflective properties of the reflection film remain substantially constant (The Examiner has interpreted "substantially constant" to be not constant or constant if it's not tuned since "substantially" can be interpreted broadly) regardless of said changed resonance wavelength of said multiple ring resonator (inherent, reflective properties of the Bragg grating are changeable by tuning) (see rejection of claim 8).

26. In re claims 20, 21 and 26, same rejection as applied to claim 8 is maintained.

Art Unit: 2828

27. In re claims 23 and 24, Jones discloses wherein film-like heaters are provided as the tuning device (The Examiner notes that a heater is implicitly taught by Jones since heating is employed to the resonator) (see rejection of claim 8).

28. In re claim 25, Jones / Po have disclosed the claimed invention except wherein a wavelength of said reflection peak can be shifted over entire region of the C-band and L-band. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified said reflection peak of Jones / Po with over the entire regions of C-band and L-band, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 MPEP 2144.05 (II-A)

29. Claims 10-12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (US Patent 6,959,028 B2) and Po (US Patent 4,852,117) as applied to claim 1 above, and further in view of Margalit et al (US Patent 6,668,006 B1).

30. In re claims 10-11, Jones / Po have disclosed the claimed invention except a wavelength detecting device for detecting a resonance wavelength of the multiple ring resonator. However, with reference to figure 10, Margalit et al disclose a wavelength detecting device (PD1 and PD2) for detecting resonance wavelength of the multiple ring resonator (col. 8 lines 23-26). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a photo-detector for detecting the

Art Unit: 2828

resonance wavelengths since it was known in the art that photo-detector is commonly used for detecting optical input.

31. In re claims 12 and 22, Jones / Po have disclosed the claimed invention except a control device for feedback-controlling resonance of the multiple ring resonator based on resonance wavelength information detected by the wavelength detecting device. However, with reference to figure 10, Margalit et al disclose a control device (Monitor) for feedback-controlling resonance of the multiple ring resonator based on resonance wavelength information detected by the wavelength detecting device (PD1 & PD2). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the tunable laser of Jones / Po with a control unit as taught by Margalit et al in order to obtain a desired wavelength (or constant wavelength) by monitoring the optical power of the laser device.

Conclusion

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 2828

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUANDA ZHANG whose telephone number is (571)270-1439. The examiner can normally be reached on Monday-Friday, 9:00am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yuanda Zhang/
Examiner, Art Unit 2828
04/10/09

Application/Control Number: 10/594,307

Page 11

Art Unit: 2828

/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828